Pest Alert

United States
Department of Agriculture

Forest Service

Northeastern Area
State and Private Forestry

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Sirex woodwasp—Sirex noctilio F. (Hymenoptera: Siricidae)

Sirex woodwasp has been the most common species of exotic woodwasp detected at United States ports-of-entry associated with solid wood packing materials. Recent detections of sirex woodwasp outside of port areas in the United States have raised concerns because this insect has the potential to cause significant mortality of pines. Awareness of the symptoms and signs of a sirex woodwasp infestation increases the chance of early detection, and thus, the rapid response needed to contain and manage this exotic forest pest.

Distribution

Sirex woodwasp is native to Europe, Asia, and northern Africa, where it is generally considered to be a secondary pest. In its native range, it attacks pines almost exclusively, e.g., Scotch (*Pinus sylvestris*), Austrian (*P. nigra*), and maritime (*P. pinaster*) pines. This woodwasp was introduced inadvertently into New Zealand, Australia, Uruguay, Argentina, Brazil, Chile, and South Africa. In these Southern Hemisphere countries, sirex woodwasp attacks exotic pine plantations, and it has caused up to 80 percent tree mortality. Most of the plantations are planted with North American pine species, especially Monterey pine (*P. radiata*) and loblolly pine (*P. taeda*). Other known susceptible pines include slash (*P. elliottii*), shortleaf (*P. echinata*), ponderosa (*P. ponderosa*), lodgepole (*P. contorta*), and jack (*P. banksiana*).

Figure 1. *Sirex noctilio*—adult female.

Figure 2. *Sirex noctilio*—adult male.

Identification

Woodwasps (or horntails) are large, robust insects, usually 1.0 to 1.5 inches long (Figures 1 and 2). Adults have a spear-shaped plate (cornus) at the tail end; in addition females have a long ovipositor under this plate. Larvae are creamy white, legless, and have a distinctive dark spine at the rear of the abdomen (Figure 3). More than a dozen species of native horntails occur in North America. No keys to identify woodwasp larvae to the species level have been developed; however, adult specimens have features to distinguish sirex woodwasp from native horntails. Key characteristics of the sirex woodwasp include these:

Figure 3. *Sirex noctilio*—larva and close-up of posterior spine.

- Body dark metallic blue or black; abdomen of males black at base and tail end, with middle segments orange.
- Legs reddish-yellow; feet (tarsi) black; males with black hind legs.
- Antennae entirely black.

Positive identification of *S. noctilio* needs to be confirmed by an insect taxonomist. Therefore, collect and submit any suspect woodwasps to your county extension or state Department of Agriculture office.

Symptoms

Sirex woodwasp can attack living pines, while native woodwasps attack only dead and dying trees. At low populations, sirex woodwasp selects suppressed, stressed, and injured trees for egg laying. Foliage of infested trees initially wilts (Figure 4), and then changes color from dark green to light green, to yellow, and finally to red (Figure 5), during the 3-6 months following attack. Infested trees may have resin beads or dribbles at the egg laying sites (Figure 6), which are more common at the mid-bole level. Larval galleries are tightly packed with very fine sawdust (Figure 7). As adults emerge, they chew round exit holes that vary from 1/8 to 3/8 inch in diameter (Figure 8).

Figure 4. Green needles wilt and point straight down.

Figure 5. Needles eventually turn red.

Figure 6. Resin beads and dribbles at egg-laying site.

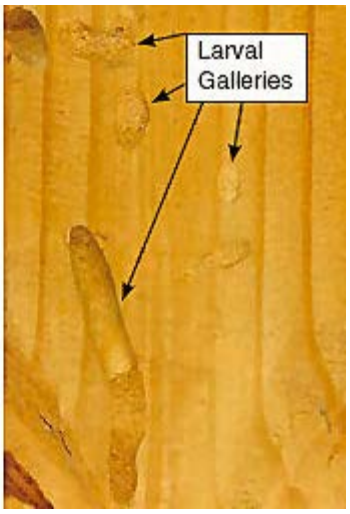

Figure 7. Larval galleries with tightly packed frass.

Biology

Sirex woodwasp is expected to complete one generation per year throughout most of the United States. Adult emergence is likely to occur from July through September, with peak emergence during August. Females are attracted to stressed trees after an initial flight. They drill their ovipositors into the outer sapwood to inject a symbiotic fungus (*Amylostereum areolatum*), toxic mucus, and eggs. The fungus and mucus act together to kill the tree and create a suitable environment for larval development. Females lay from 25 to 450 eggs, depending upon size of the female. Unfertilized eggs develop into males, while fertilized eggs produce females. All larval instars feed on the fungus as they tunnel through the wood. The number of instars varies from 6 to 12, and the

larval stage generally takes 10-11 months. Mature larvae pupate close to the bark surface. Adults emerge about 3 weeks later.

Figure 8. Round exit holes.

Biological Control

Sirex woodwasp has been successfully managed using biological control agents. The key agent is a parasitic nematode, *Deladenus siricidicola,* which infects sirex woodwasp larvae, and ultimately sterilizes the adult females. These infected females emerge and lay infertile eggs that are filled with nematodes, which sustain and spread the nematode population. The nematodes effectively regulate the woodwasp population below damaging levels. As sirex woodwasp establishes in new areas, this nematode can be easily mass-reared in the laboratory and introduced by inoculating it into infested trees. In addition to the nematode, hymenopteran parasitoids have been introduced into sirex woodwasp populations in the Southern Hemisphere, and most of them are native to North America (e.g., *Megarhyssa nortoni, Rhyssa persuasoria, Rhyssa hoferi, Schlettererius cinctipes,* and *Ibalia leucospoides*).

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